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Specification and Drawings, as originally filed, with Application for Patent Serial No: **2,450,547**, on November 21, 2003, by S.L. TECH INC., assignee of Alain Côté and Philippe Lapointe, for "Roof for Manure Storage Tank".

Agent certificateur/Certifying Officer

January 23, 2004

Date

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ABSTRACT

Roof For Manure Storage Tank

The present invention relates to a roof adapted to cover a manure storage tank. The roof comprises a plurality of trusses and sheeting members. The roof is constructed so as to minimize the lateral forces on the manure storage tank and to eliminate vertical forces on the centre point of the floor of the storage tank.

BACKGROUND OF THE INVENTION

A number of covers for manure storage tanks are known in the art. A number of these are inflatable covers which do not provide for ventilation of the storage tank. Access to the manure storage tank for emptying of the storage tank, for example, is difficult. Furthermore, the life span of inflatable cover members is limited. Such covers also need to be secured to the storage tank. These are often secured to the tank in such a fashion that forces on the cover are transmitted laterally to the tank which could lead to cracking of the said tank.

Other non-inflatable domes have a very complex structure. By way of example, Canadian patent application 2,220,382 provides a ventilated flexible dome. The dome includes a circular base, a rigid ridge pole, support cables connecting the base to the ridge pole, a cover and a flexible membrane arranged on the support cables, a ventilation cone with a rigid ridge pole. The construction of such a dome cover is complex and a cable arrangement is necessary to support the structure. Furthermore, the cover attaches to the outside of the storage tank and, as such, any pressure applied to the cover would create lateral forces on the storage tank which increases the risk of cracking of the storage tank.

The roof of the present invention has a structure which affords it flexibility to withstand the forces applied thereon. Furthermore, the structure of the roof is such as to minimize lateral forces applied to the storage tank thus minimizing the risk of cracking thereof. It is important to minimize the risk of cracking of the manure storage tank which could result environmental damage and in costly clean-up operations.

SUMMARY OF THE INVENTION

The invention relates to a roof for a generally cylindrical wall structure. The roof has a frusto-conical configuration and comprises a central, tubular hub and a plurality of trusses extending radially outwardly therefrom. Each of said trusses has a proximal end and a distal end. The proximal ends of the trusses are connected to the central, tubular hub. The trusses

comprise parallel upper and lower beams spaced apart and secured together by generally V-shaped chord members and intermittent vertical connecting members extending normally to said upper and lower beams. A plurality of support beams extend between adjacent trusses. The trusses and the support beams form the upper surface of the roof. A covering for the roof comprises sheeting members which are secured to the upper surface of the roof. Plate members having low frictional surfaces are located intermediate a lower edge of the roof and an upper surface of the cylindrical wall structure covered by the roof.

DETAILED DESCRIPTION OF THE DRAWINGS

Figure 1 is a top view of the said roof;

Figure 2 is a vertical cross-section of the roof of the present invention;

Figure 3 is a perspective view of the roof of the present invention without the sheeting members;

Figure 4 is a perspective view of the roof of the present invention without the sheeting members and wherein the support beams have been secured to only one portion of the roof;

Figure 5 is an enlarged view of one the means for securing the roof to the cylindrical structure; and

Figure 6 is an enlarged view of the reinforcement member of the roof.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The roof 10 is adapted to cover manure storage tank 12 having a generally cylindrical wall structure. The roof 10 has a frusto-conical configuration. As illustrated in Figure 2, it comprises a central, tubular hub 14. The hub 14 comprises an upper ring 16 and a lower ring 18 spaced from one another by members 20 which are disposed perpendicularly to the rings 16 and 18. The hub 14 can be made of steel.

As seen in Figures 2 to 4, the roof 10 also comprises a plurality of trusses 22 which extend radially outwardly therefrom. The trusses 22 are made of steel or of other suitable material having comparable strength characteristics. Each truss 22 has a proximal end 24 and a distal

end 26. The proximal end 24 of each truss 22 is connected to the hub 14. The hub 14 serves to anchor all of the trusses 22 and allows for the roof to be constructed without a central support post. This avoids the disadvantages associated with a central support post, namely the transmission of vertical forces to the floor of the tank 12 and the associated risks of cracking of the tank 12 which could result therefrom. The hub 14 also allows for ventilation of the gases emanating from the storage tank 12.

Each truss 22 comprises parallel upper beams 28 and lower beams 30 spaced apart and secured together by V-shaped chord members 32 and intermittent vertical connecting members 34 which extend perpendicularly to the upper 28 and lower 30 beams. Support beams 36 interconnect the upper beams 28 of the adjacent trusses 22. The support beams 36 can be secured to the upper beams 28 of the trusses 22 by means of screws. The upper beams 28 of the trusses 22 and the support beams 36 form the upper surface 38 of the roof 10.

A post member 40 extends perpendicularly to the distal end 26 of each parallel upper beam 28 and lower beam 30. In a preferred embodiment as illustrated, the post member 40 is an I-shaped beam. The post member 40 has an upper end 42 and a lower end 44. The lower ends 44 of the post members 40 form the periphery 46 of the roof 10.

Sheeting panels 48 serve as a covering for the roof 10. The sheeting panels 48 are preferably made of steel. They can also be made of any other suitable material such that the panels have sufficient strength and are impermeable, such as corrugated tar paper panels and the like. The sheeting panels 48 are secured to the upper surface 38 of the roof 10. In a preferred embodiment, the sheeting panels 48 are secured by means of screws to the support beams 36.

Plate members 50 having low frictional surfaces are secured to the lower end 44 of the post members 40. In a preferred embodiment, the plate member 50 is made of polyethylene such as UHMW polyethylene. The plate members 50 minimize the lateral forces which will be transmitted from the roof 10 to the manure storage tank 12.

As seen in Figure 5, the lower ends 44 of the post members 40 are secured to the storage tank 12 by means of brackets 52 which will prevent the roof 10 from lifting off the storage tank 12. The brackets 52 do not prevent the movement back and forth of the post members 40.

As seen in Figure 6, a reinforcement belt 54 comprising a plurality of interconnected units 56 is secured about the outer surface of the post members 40. The reinforcement belt 54 will prevent the post members 40 from being displaced off the surface of the storage tank 12 by the forces being exerted on the roof 10, such as the weight of snow during the winter, which could result in the collapse of the roof 10.

In a preferred embodiment which is not illustrated, an access door can be constructed in the roof 10 by making an opening between two adjacent trusses 22 in one of said sheeting panel 48 and through the support beams 36 and securing a door in said opening. The door can be used to gain access to the storage tank 12 without having to remove the roof 10 from the tank 12.

In use, the roof 10 is placed on the manure storage tank 12. It is secured to the storage tank 12 by means of the brackets 52. The construction of the roof 10 is such that it can withstand forces applied thereon, such as the weight of snow during the winter time. The plate members 50 minimize the transmission of lateral forces from the roof 10 to the storage tank 12 which could possibly lead to the cracking of the tank 12. The reinforcement belt 54 is secured about the outer surface of the post members 40 to prevent their displacement off the surface of the storage tank and the resulting collapse of the roof 10.

In the drawings and specification , there have been disclosed typical preferred embodiments of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being set forth in the following claims.

The embodiments of the invention in which an exclusive privilege or property is claimed are as follows:

1. A roof for a generally cylindrical wall structure, said roof having a frusto-conical configuration and comprising a central, tubular hub and plurality of trusses extending radially outwardly therefrom, each of said trusses having a proximal end and a distal end; the proximal ends of said trusses being connected to said central, tubular hub; each of said trusses comprising parallel upper and lower beams spaced apart and secured together by generally V-shaped chord members and intermittent vertical connecting members extending normally to said upper and lower beams; a plurality of support beams extending normally between adjacent upper beams of said trusses; said upper beams and said support beams forming an upper surface of the roof; a covering for said roof comprising sheeting members secured to the upper surface of said roof; and plate members having low frictional surfaces located intermediate the lower edge of the roof and an upper surface of the cylindrical wall structure covered by the roof.

2. The roof of claim 1 further comprising means to secure said roof to the upper surface of said cylindrical wall structure.

3. The roof of claim 1 or 2 further comprising a generally cylindrical reinforcement member secured adjacent the lower edge of said roof.

4. The roof of any one of claims 1 to 3 wherein said plate members are made of polyethylene.

5. The roof of any one of claims 1 to 4 wherein said sheeting members are comprised of stainless steel.

6. The roof of any one of claims 1 to 5 further comprising an access door to said cylindrical structure.

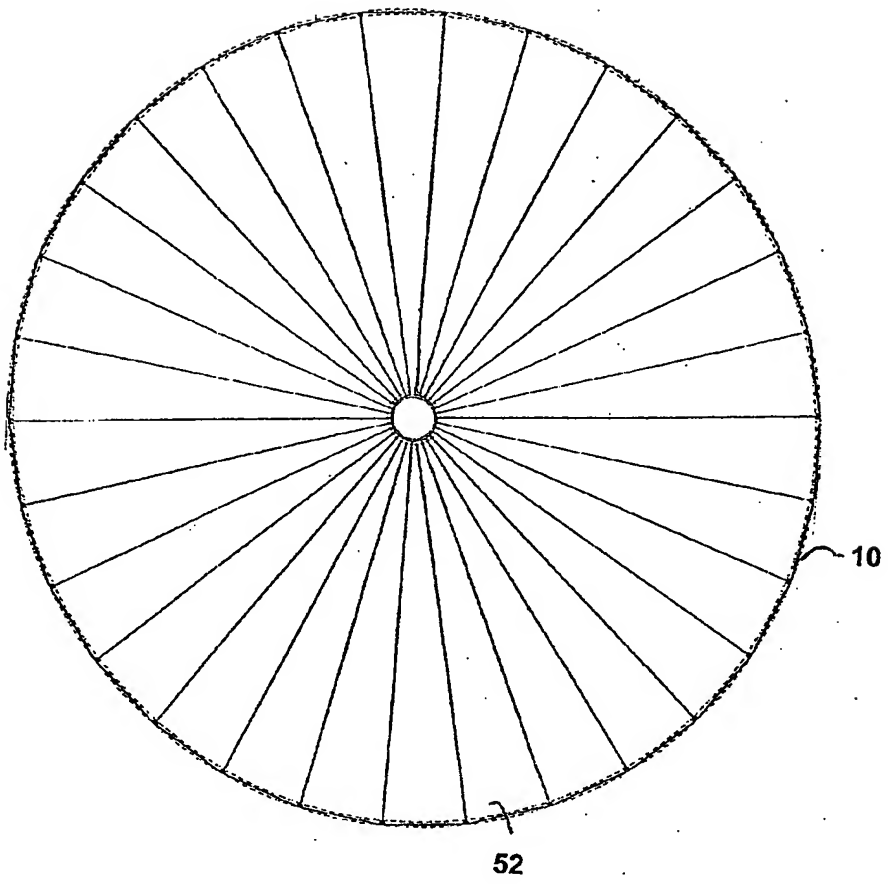

Figure 1

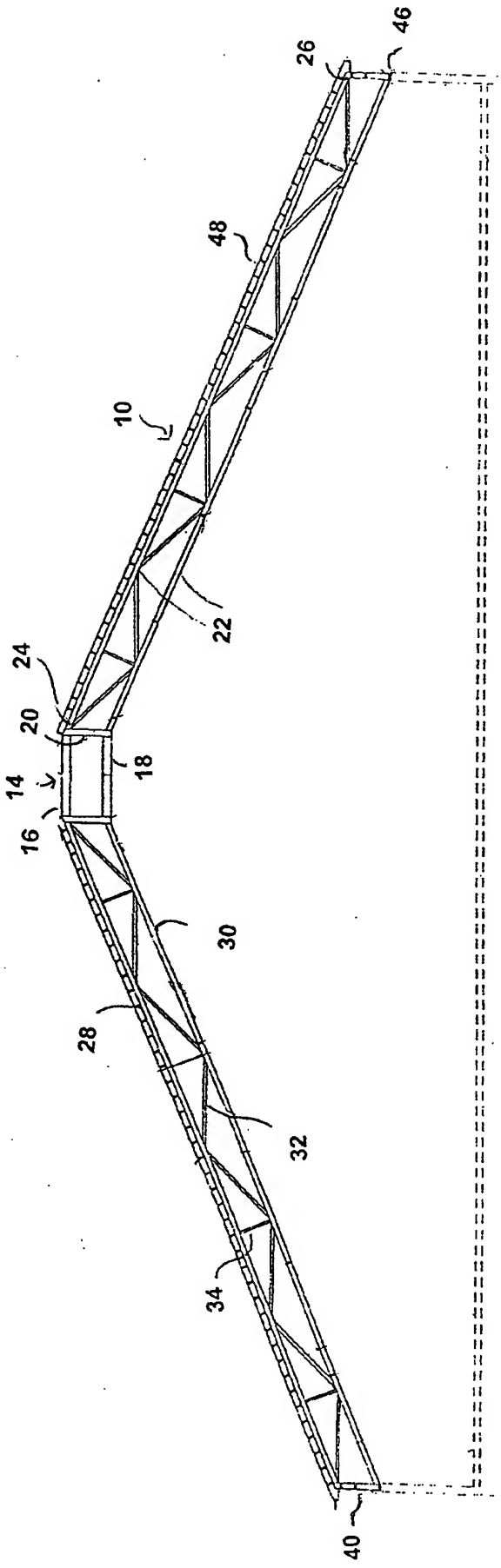

Figure 2

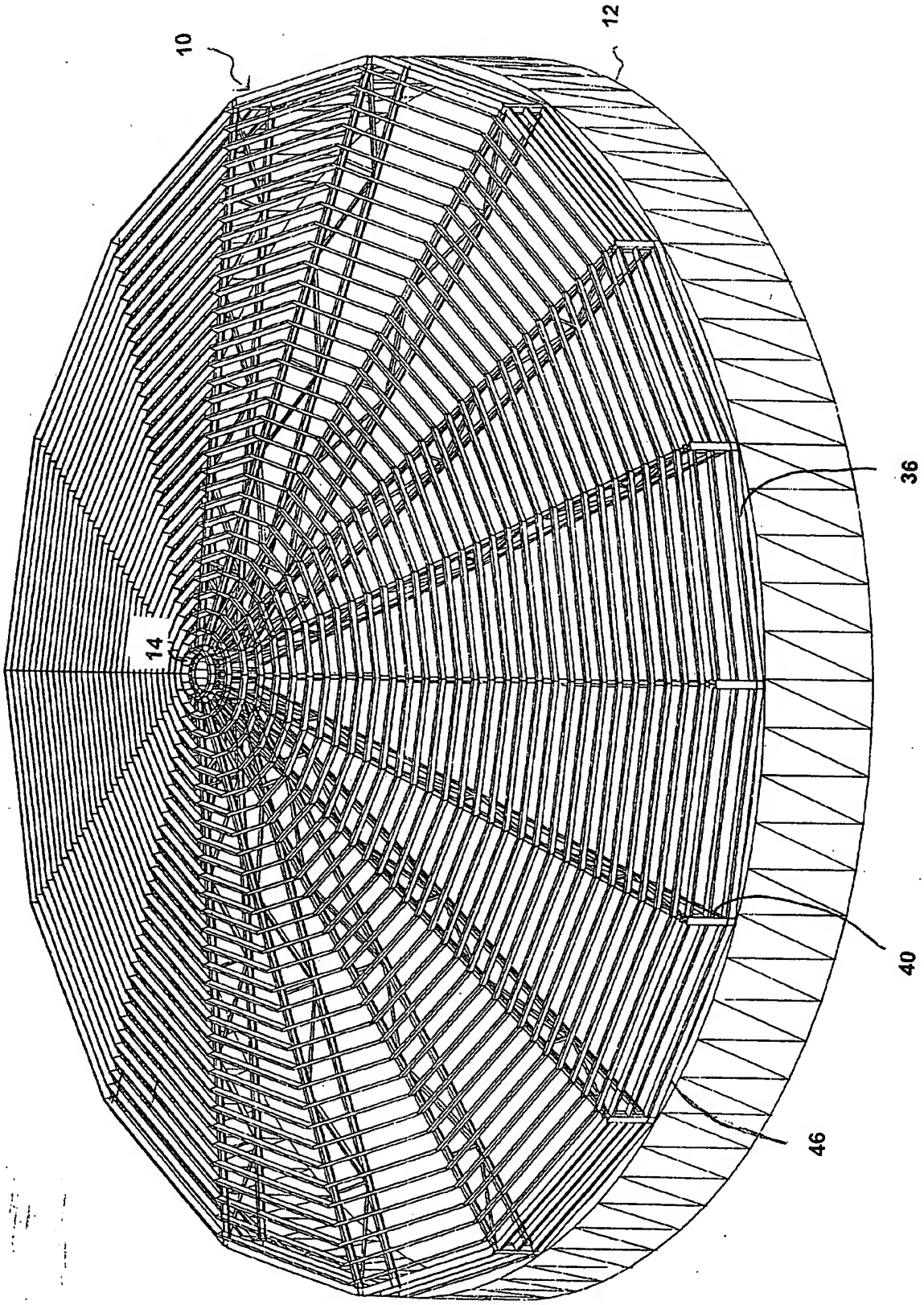

Figure 3

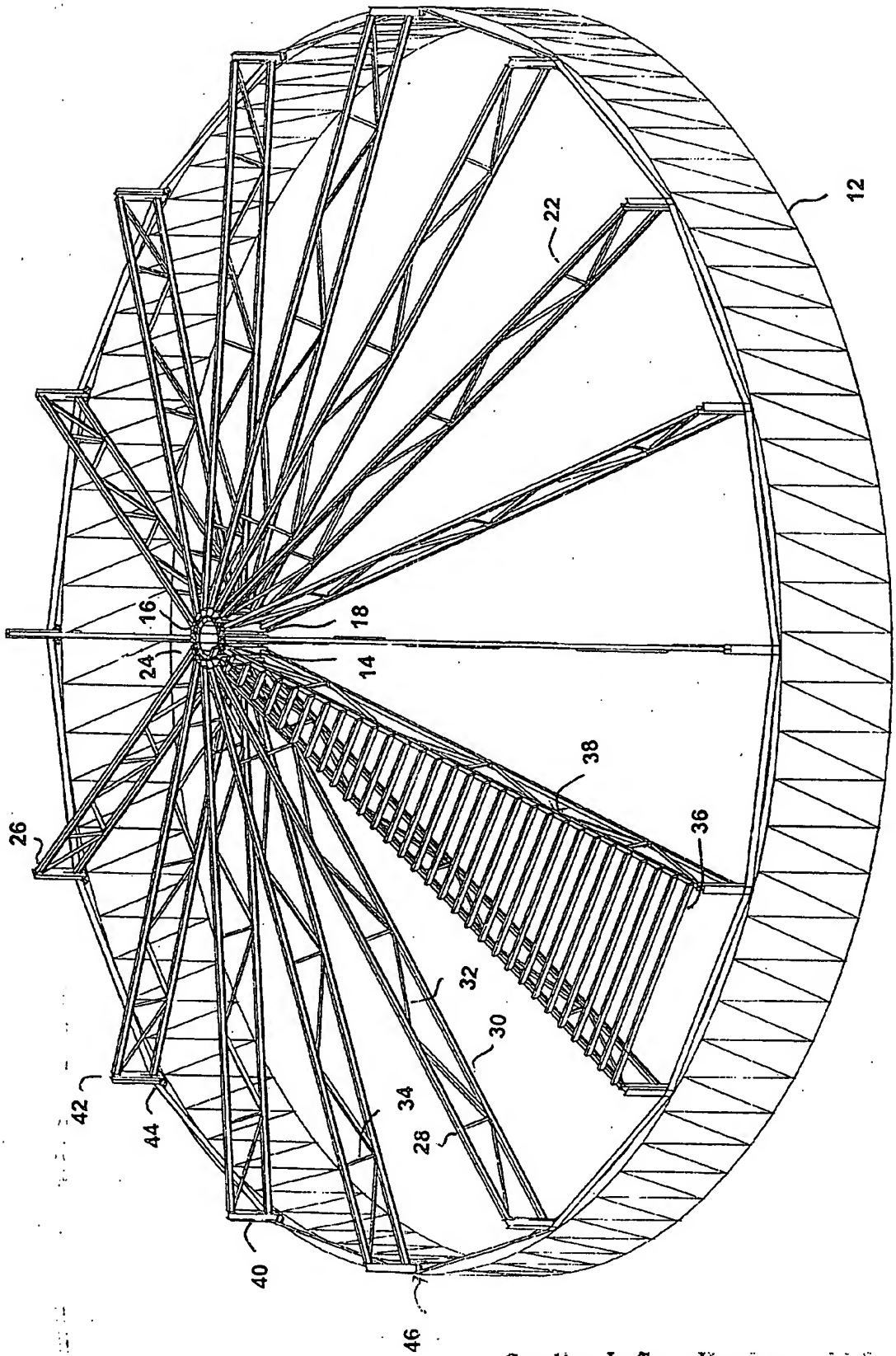

Figure 4

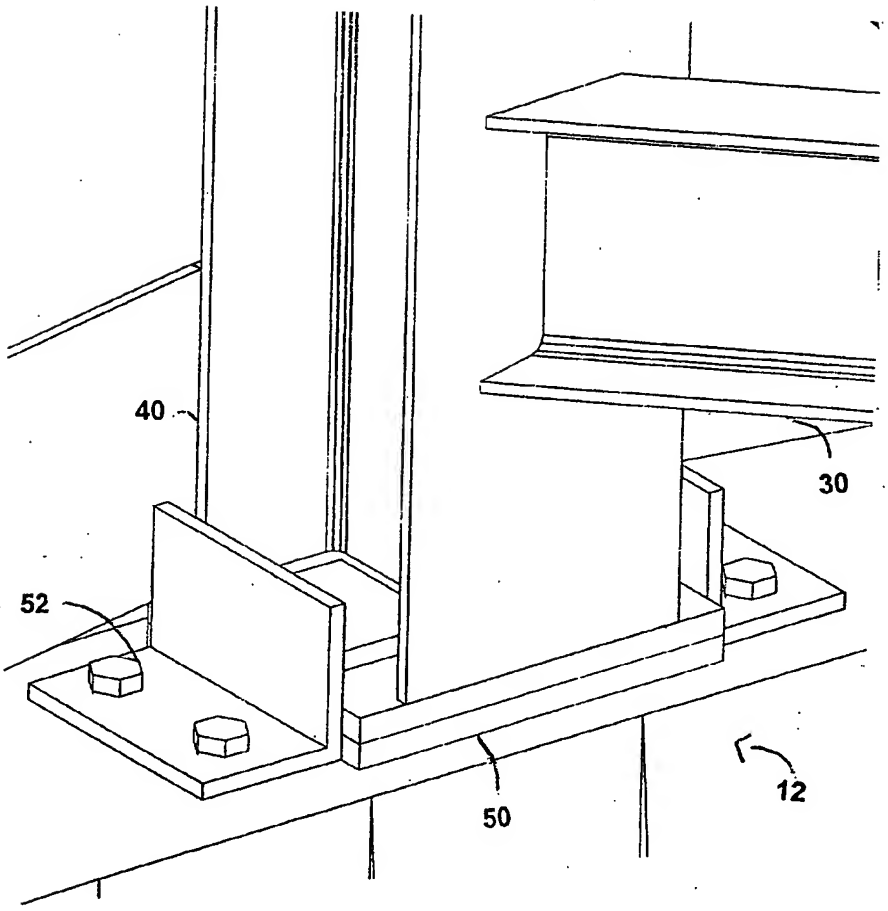

Figure 5

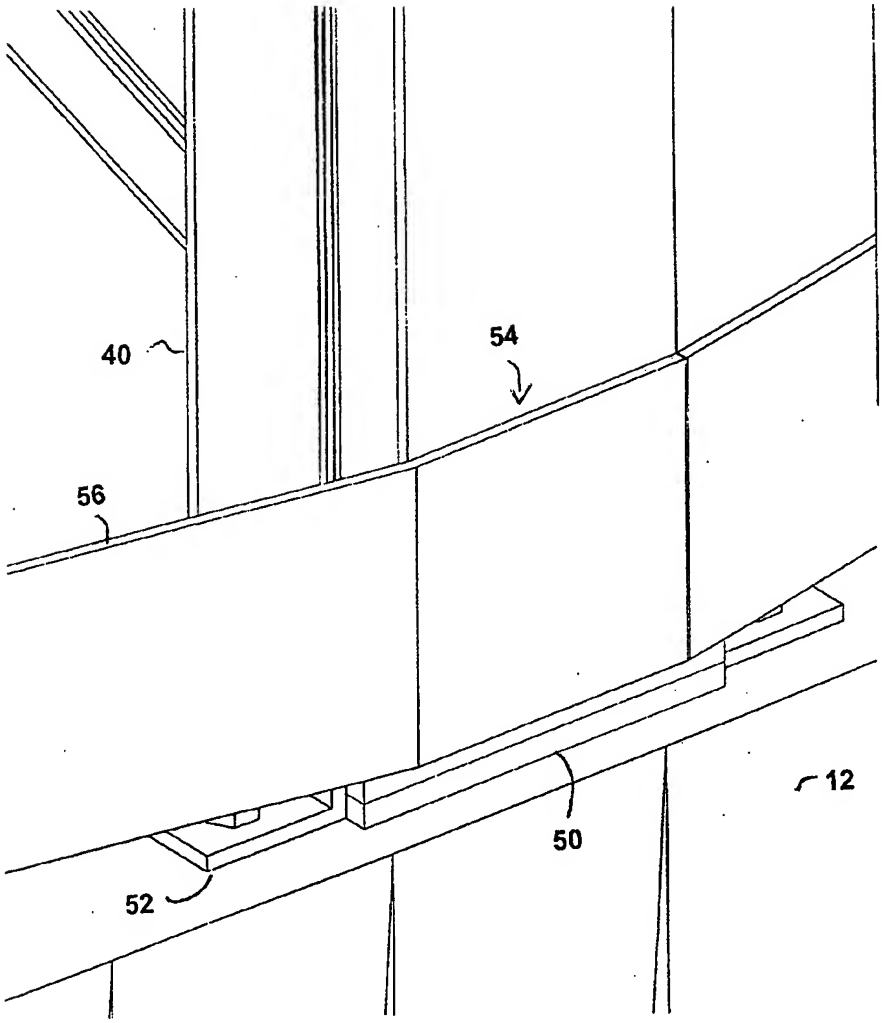

Figure 6